DOCUMENT RESUME

ED 168 538 IR 007 062

AUTHOR Hinton, John R.
TITLE Individualized Instruction, What the Research Tells Us.
PUB DATE 19 Apr 78
NOTE 15p.; Paper presented at the Annual Meeting of the Association for Educational Communications and Technology (Kansas City, Missouri, April 19, 1978)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Behavioral Objectives; Cost Effectiveness; *Educational Research; *Individualized Instruction; Learning Modules; Mastery Learning; Performance Based Education; Proctoring; Retention; Student Teacher Relationship; Study Guides; *Teaching Methods

ABSTRACT

Literature on individualized learning appearing in the past three years includes many reports which are rewritings from the same data; however, generalizable results do exist for the practitioner. Individualized instruction systems work as well or better than traditional, conventional instruction. Students learn more, make higher grades, save time, perform better on examinations, and feel improvement in self-concept and self-confidence. Withdrawals appear to be about the same as in traditional courses, but great variability is suggested. Student attitudes are favorable; they like self-pacing, although lack of discipline and motivation cause difficulties. Learning modules and study guides are helpful and well liked; the value of lectures is uncertain. Learning objectives produce significant increases in learning, while proctors can improve the rate of student progress. Retention of learning is improved by individualized instruction and mastery learning reduces forgetting. Students like self-grading but feel more is learned with proctor-grading. Test anxiety and grade pressure are reduced with individualized learning, and increased student-staff interaction results in higher student appraisals of staff. Cost benefit studies are infrequent and assessments are imprecise. As materials used in individualized instruction increase in number, researchers continue to investigate their effectiveness and benefits. (CWM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED168538

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

INDIVIDUALIZED INSTRUCTION, WHAT THE RESEARCH TELLS US

by

John R. Hinton

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

John R. Hinton

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

IR000702

INDIVIDUALIZED INSTRUCTION. WHAT THE RESEARCH TELLS US.

John R. Hinton
Dean, Instructional Services
Cabrillo College
6500 Soquel Drive
Aptos, CA 95003

In the past three years there have been a large number of articles and books added to the literature of individualized learning. About 300 of these were read and results tabulated to determine what general summation might be made. For purposes of generalization, the unique features of the various individualized instruction systems have been ignored and the commonalities stressed. There does not appear to be a great difference between the P.S.I. proctor, the audio-tutorial student assistant, the peer tutor, or the instructor when they are all engaged in the identical act of evaluating the performance of an individual student and assisting with instructional materials. Some segments of the separate systems may not be so transferable, but no attempt has been made to respect the orthodoxy of the separate methods.

While the literature is copious, the research is not. There appears to be a plethora of reports, but many are rewritings from the same data.

But what is the message for the practitioner? Clusters in the tabulated findings are summarized:

1. Performance. I.I. (Individualized Instruction) works. Mastery learning works. Competency-based instruction works. Audio-tutorial instruction works. The Personalized Systems of Instruction works. Programmed instruction works. In all evaluations these systems work as well, and usually better than traditional, conventional instruction.

A paper presented at the International Congress for Individualized Instruction session for the 1978 Convention of the Association for Educational Communications and Technology, Kansas City, KS

Students learn more, make higher grades, save time, and perform better on either essay or objective examinations. Performance in I.I. systems show students learn 15-20% more, attain one or two final exam grades higher, or gain about one standard deviation more than conventional instruction. Few report failures, either of students or of instructors. Increased performance improves student self-concept and self-confidence. Students feel they learn more. What makes it work? There is a great deal of research on some of the components in individualized learning systems. There are many comparative studies and P.S.I. reports tutors to be a significant factor. In Audio Tutorial, the learning materials appear important.

2. Which students gain the most? High-A (Aptitude). Low verbal. Low-A. The curious. The competent. The maladaptive. The high-test anxious. The C student. The inadequately prepared. The well prepared. The proctors in P.S.I. The T.A.'s in A-T's. What we have not gathered much data on is the significance of reading grade placements on achievements in individualized learning systems. Or which students benefit the most from which components in the systems. Or how results relate to materials.

3. Withdrawals. Generally appear to be about the same as in traditionals. As high as half the students; in some, four times as many as the comparitive conventional; less than 1%. A great variability is suggested. Probably a result of instructors, students, proctors, grading systems of registrars, drop policies, materials qualities, G.P.A.'s external factors, and interactions between variables. We're still only doing preliminary work on how to nurture the self-discipline a student needs to be successful in an individualized learning enviornment.

4. Student Attitudes. Overwhelmingly favorable, and remaining favorable when questioned two years later. However, one author comments that student attitudes toward all innovations are positive! Attitudes appear to improve with mastery systems, with increased interaction of teachers and proctors. As a generalization about 90% of the students like, prefer, and/or would take another I.I. course if given the choice between traditional and I.I. The only complaint by students is that these courses cause them to work "too hard." Study time spent is an average of 15 hours per course unit. Some students feel this is more than their traditional courses demand. Perhaps we need to re-evaluate the concept of course "work". We need too, to convey to reimbursing state departments of education that the achievement of competencies by students is more significant.
5. Do students like self-pacing? Overwhelmingly YES. It increases their convenience, increases their achievement when coupled with mastery, allows for compensation of entering individualized differences, and it apparently does not bother them if the course pace is set by the instructor if the learning pace is controlled by the students. Self-pacing permits earlier course completions. What we need yet to know is how to either motivate or manage contingencies to encourage the self-learner to keep pace.
6. Do students have difficulties with self-pacing? YES. They lack, in many cases, the discipline which I.I. requires, they procrastinate unless the instructor interferes. Motivation appears to be a key ingredient. As many as 2/3 lag behind an expected schedule, yet the literature shows 70% complete in the session in which enrolled.

They may, however, complete at the slowest rate possible unless they have self-discipline and are willing to take responsibility for their own learning. Lots of advice is given to combat procrastination - remedial tutoring, early start requirements, instructor conferences, proctor-prodding, doomsday deadlines, etc. If the student must report the gap between his own position in the course compared to a suggested progress schedule, self-pacing is improved. We know some of these contingency managements work well, but we do not know which work best for which students - or which are optimal.

7. Do students like individualized learning modules? YES. Whether P.S.I. units, audio-tutorial mini-courses, learning activity packets, or packages by other acronyms. They enjoy choices in modules, with general, optional, remedial, and advanced. Modules save time, since it is possible to reduce lecture topic content into 15-25 minutes of tape time. Student rates for progress through tape-based modules are reported at 2X, and other modules develop an average (A) time, with student times ranging from 1/4A - A - 16A. Time is dependent upon content and integrated experiences, as well as student pace. Modular approaches allow early completion, and dependent upon instructor or institutional policies, carry-over into an additional term(s) without penalty.

8. Are lectures valuable to I.I. systems? YES and NO. Probably depends on the lecturer. Some report lectures are viewed as interesting, entertaining, or motivational. Many report the lecture does not seem to work at all. Attendance can be maintained by point awards or compulsion, but falls off if not mandatory. Suggested to be of less value than either movies or discussion. Several write of

parallel presentations by instructors - a lecture track and an I.I. track - a student may opt either/both. We have few comparative reports of options exercised or performances achieved when students have choices in learning paths.

9. Are study guides helpful? YES. Most students favor them. Using the study guide to integrate materials increases learning. Questions which interrupt reading passages increase learning. Questions which interrupt visual presentations and force a summary increase learning. Knowledge that questions will follow a presentation increases learning. Questions can be either oral or written. Insertion of questions increases study time. Questions before a presentation of material increases direct (intentional) learning. Learning guides appear frequently to be based only upon the past experience of the instructor who prepares them; past group practices which worked well, examinations used in prior traditional teaching. There are few reports on systematic development of learning materials based on learning theory guidelines.

10. Do learning (behavioral) objectives help? DEFINITELY. They focus study and produce a significant increase in learning. Students indicate the best use of their time comes from knowing what to study. Specific objectives increase specific or directed learning. General objectives increase both specific and incidental learning. Hard-goal objectives produce more learning than easy-goal objectives.

11. Are proctors necessary? The proctor role, as used in P.S.I., seems immensely helpful. Teachers can proctor. Students within the course who have already mastered material can proctor. Students can be hired to proctor, paid with credits or money. Graduate students do not proctor as well as undergraduates because graduate students tend to

assume the traditional teacher's lecturing role. 60% of P.S.I.'s report use of proctors. Not all units need to be proctored, but less than 25% decreases learning gain. External proctors can be used until internal (within-the course) proctors develop. Proctors or tutors improve the rate of student progress through the course. Proctors learn more. Have we overstated the case for proctors in P.S.I. because they are a part of the system to be defended? Do we overstate the format of A-T because we're proprietary?

12. Is retention of learning improved by individualized instruction? YES. On unit exams or course review examinations or final examinations. And, later retention studies from half a semester through two years after the I.I. course show improved retention. The data from longitudinal studies is sparce, and frequently contaminated by the methods used to study and report it.

13. What are the effects of mastery learning requirements? Most studies indicate students work harder and learn more, and retain the learning better. There is less forgetting after mastery. Mastery requires more testing of students, averaging about 1.5 tests per module. A slightly less than perfect (85-90%) criterion seems to produce as much learning as 100%, eases the number of re-tests, allows the student to progress at a faster rate. Higher results may be obtained from higher criteria, but with an increased demand on proctors, teachers, TA's, or tutors time. Test repeats increase performance. Mastery quizzes identify students in trouble earlier in the course - providing opportunities for assistance and remediation as alternatives to withdrawals and failure. Little data is to be found on the numbers of students who enter a course with pre-test mastery of parts of the course. How many, what proportions, and what alternatives open to them did they use?

14. Grading module performance may be done by the student, or an aide, teacher or proctor. With self-testing, all units or modules do not have to be monitored. Students like self-grading, but feel they learn more when proctor-graded. Proctor evaluation seems better for students having difficulty in course content or progress. Students report test-anxiety and grade pressure is reduced with individualized learning. Extra credit conditions are elected more by higher achievers. We need to take another look at the record keeping, testing and course management potential which is offered by the increasingly inexpensive mini or microcomputer.

15. All studies indicate more student-staff interaction. Students like having help when needed. Instructor time gained by abandonment of lectures is most frequently spent in increased student contact. Increased contact relates directly to immediate knowledge of results and error correction. Students have higher appraisals of staff when interaction is increased.

16. Cost-benefit studies are infrequent, and assessments imprecise. Very small classes can be offered, or several individualized small classes can be taught by the same instructor (disciplines permitting) in the same space, avoiding cancellation of necessary courses. Cost benefit, however, accrues more to larger classes, with differentiated staffing and paraprofessionals. While initial costs of implementing individualized learning programs may be high, these drop by about half in the second offering, and drop to 25-30% in subsequent offerings. I.I. does not appear to be cost-effective in the short term, but is in the long term. Established programs appear to cost about one-third to two-thirds more than the lecture class. Factors such as improved

student attendance, increased student learning, exportability of developed courses, increased student-staff interaction, and increases in course content covered are difficult to value for cost-comparison purposes. Since there is no real and measureable "product" in education, there is poor cost-benefit reporting.

17. Materials used in individualized instruction are increasing and some research is continuing regarding their effectiveness and benefits. Illustration and print shows less learning gain than illustration with audio. Pictures facilitate learning, but the research does not show which tasks, which content, or which learners profit from their use. There is no difference in learning between the instructor-voice and the professional narrator, but students find the professional narrator easier to listen to, but identify with the instructor. Varied stimuli appears to be more fruitful. Any media without instructors works less well than with instructors. TV, for example, is not popular on campuses, and on-campus TV students do not achieve as well as those away from campus. Students like TV as a component of a course, however. An increased number of applications of compressed/expanded (rate-controlled) speech appears in the literature, as do computer testing and records management. Little data about performance is furnished with commercially-available materials. Field testing results would be helpful.

18. The trends appearing in the literature suggest that the individualized learning systems have been proven. There is more component analysis, but still a heavy description of applications of the systems in a variety of disciplines. More is being learned about what helps students learn, and many ideas seem applicable to improved instruction and learning in any circumstance, individualized or not. Faculty resistance to

Individualized learning appears to be diminishing, and the application of I.I. is spreading very rapidly in comparison to the generally slow pace of most educational innovation. Perhaps, the real advantage of individualized instruction programs and the literature which I.I. has generated is that good teaching/learning practices are made visible. We are just beginning to examine and evaluate what we see.

Much of what is reported in hundreds of articles in the literature can be gained from few sources.

Four organizations publish newsletters, journals, books, conference proceedings, etc., dealing with individualized instruction:

1. A.P.L.E.T. Association for Programmed Learning and Educational Technology, 20 Queen Anne Street, London W1M 0AY, England.
2. The Center for Personalized Instruction (P.S.I.), 29 Leavitt Hall, Georgetown University, Washington, DC 20057.
3. I.C.I.I. International Congress for Individualized Instruction, c/o Ms. Ruth Wilson, Fordham University, Bronx, NY 10458.
4. N.S.P.I. National Society for Performance and Instruction, Box 256, Route 1, Charles Town, West Virginia 25414.

A small stack of books presents an immense amount of both general and specific information of value to individualized instruction/learning. The Center for Personalized Instruction has conference proceedings of the 1st (Ruskin/Keller, 1976), 2nd (Green, 1975) and 4th (Center for Personalized Instruction) national conferences. Ruskin (1976) provides an excellent description of P.S.I., complete enough to guide the beginner. Ruskin (1976) reviews recent P.S.I. literature and includes a number of papers originally presented at the Eastern Psychological Association annual meeting in 1975. Ruskin and Keller (1976) presents another valuable review

of P.S.I. research. Sherman (1976) includes earlier P.S.I. works, both research and descriptive of applications. Keller and Sherman (1974) develop a handbook which presents the origin, features, uses and research results for P.S.I.

Audio-tutorial works of value include Postlethwait, Novak, and Murray (1969) which defines and describes the earlier A-T system. Extensions and applications of A-T are presented in Kreager and Murray (1971). Early A-T descriptive and research studies are presented in Kinsey (1970). Russell (1974) develops a very practical "how-to" guide for teachers interested in a modular approach, generally along A-T lines.

Fairley and Morgan (1970) contains papers on history, scheduling, information, methodology, organization and case studies from a behavioral view. Johnson and Ruskin (1977) add descriptive and research works of a behavioral cast, but closely related to P.S.I. Clarke and Leedham (1976) and Rose and Blackwood (1976) display the work of S.P.I.R.E., and its conference papers. Evans (1973) describes learning materials, selected papers and other I.I. formats, including I.P.I., P.L.A.N., L.A.P. and I.N.I.P.A.S. Thompson (1977) describes I.G.E., while Hildebrand (1977) annotates the literature of mastery learning.

For a rationale for I.I., Green (1971) brings the problem of the "new student" to attention - the student new to the college, and the student who presents unique problems for traditional instruction. Green (1975) creates a frame of reference for individualized learning, and in her recent (1976) work discusses instructional methods that individualize learning and that incorporate mastery - an excellent outline for the direction which research might take over the next few years. Meeting the special needs of the "new student" is suggested by Roueche and Snow (1977) with a number of

ideas which are of value to the instructor in individualized programs. Cross (1977) documents the arrival of the instructional revolution and the growth of individualized learning programs.

BIBLIOGRAPHY

1. Center for Personalized Instruction. 4th National Conference Proceedings: Personalized Instruction in Novel Environments, San Francisco, April 15-17, 1977. (Washington, DC, C.P.I., 1977).

2. Clarke, John and John Leedham (Eds.). Aspects of Educational Technology X: Individualized Learning. Proceedings of the Tenth Annual Conference, A.P.L.E.T., Dundee College of Education, April 1976. (London, Kogan Page, 1976).

3. Cross, K. Patricia. Beyond the Open Door. (San Francisco, CA, Jossey-Bass, 1971).

4. _____. "Beyond Education for All-Toward Education for Each." Paper presented at the Annual Conference of the California Community and Junior College Association, November 3, 1975. (mimeo, 1975). A parallel coverage is contained in Chapter 1 of Accent on Learning.

5. _____. Accent on Learning. (San Francisco, CA, Jossey-Bass, 1976).

6. _____. "New Roles for College Teachers," Community College Frontiers, (Winter, 1977).

7. Craeger, Joan and Darrel L. Murray. The Use of Modules in College Biology Teaching. (Washington, DC, American Institute of Biological Sciences, 1971).

8. Duane, James E. (Ed.). Individualized Instruction: Programs and Materials, (Englewood Cliffs, NJ, Educational Technology Publications, 1973).

9. Fraley, Lawrence E. and Ernest A. Vargas (Eds.). Proceedings of the Third National Conference on Behavior Research and Technology in Higher Education. November, 1975. (n.p., Society for Behavioral Technology and Engineering, 1976).

10. Green, Ben F. (Ed.). Personalized Instruction in Higher Education. Proceedings of the Second National Conference, Los Angeles, CA, March 21-22, 1975. (Washington, DC, Center for Personalized Instruction, 1976).

11. Hinton, John R. Audio Tutorial Practices in California Community Colleges, 1970. ED 042 454.

12. Howe, Anne and A.J. Romiszowski (Eds.) International Yearbook of Educational and Instructional Technology. (London, Kogan Page, 1976).

13. Johnson, Kent R., and Robert S. Ruskin. Behavioral Research: An Evaluative Review. (Washington, DC, American Psychological Association, 1977).

BIBLIOGRAPHY (Continued)

14. Keller, Fred S. and J. Gilmour Sherman. The Keller Plan Handbook: Essays on a Personalized System of Instruction. (Menlo Park, CA, W.A. Benjamin, 1974).

15. Postlethwait, S.M., J. Novak, and H.T. Murray, Jr. The Audio-Tutorial Approach to Learning. (2nd Edition). (Minneapolis, MN, Burgess Publishing Co., 1969).

16. Rouche, John E., and Jerry T. Snow. Overcoming Learning Problems. (San Francisco, CA, Jossey-Bass, 1977).

17. Ruskin, Robert S. The Personalized System of Instruction: An Educational Alternative. E.R.I.C. Higher Education Research Report Number 5. (Washington, DC, American Association for Higher Education, 1974).

18. ____,(Ed.). An Evaluative Review of the Personalized System of Instruction. (Washington, DC, Center for Personalized Instruction, 1976).

19. ____, and Stephen Bono (Eds.). Personalized Instruction in Higher Education: Proceedings of the First National Conference, San Francisco, CA, April 5-6, 1974. (Washington, DC, Center for Personalized Instruction, 1974).

20. ____, and John H. Hess. The Personalized System of Instruction in Higher Education: An Annotated Review of the Literature. (Washington, DC, Center for Personalized Instruction, 1974).

21. Russell, James D. Modular Instruction: A Guide for Developing Individualized Materials (Minneapolis, MN, Burgess Publishing Co., 1974).

22. Sherman, J. Gilmour. Personalized System of Instruction: 41 Germinal Papers. (Menlo Park, CA W.A. Benjamin, 1974).

23. Thompson, Sydney. Competency-Based Education: Theory and Practice. E.R.I.C. School Management Digest #1. (n.p., Association of Calif. School Administrators, 1977).

24. Wildemuth, Barbara M. Mastery Learning and Testing: An Annotated E.R.I.C. Bibliography. E.R.I.C. T.M.E. (Princeton, NJ, Educational Testing Service, 1977).